Unbundling Reliability Functions and Responsibilities

NERC Control Area Criteria Task Force

The Issues

Why Are We Doing This?

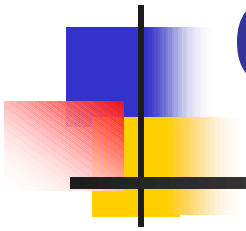
Long-term issues

- Industry restructuring
  - Utilities are unbundling their operating functions
  - Control Area roles are changing
- Need to figure out “who” does “what”
  - New Reliability Model
  - Removing the commercial advantages of performing reliability functions
  - Policy restructuring

Why Are We Doing This?

Short-term issues

- Develop Criteria and Certification processes for:
  - Control Areas and
  - Security Coordinators



Control Area: Changing Roles

The Control Area: The Past

- Balanced load and generation
- Set up and implemented interchange
- Responsible for transmission security

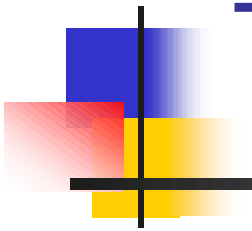
The Control Area: Today

- Balances load and generation
- Implements interchange
  - Set up by merchant
- May or may not own generation
- May or may not operate transmission
  - May or may not perform the Security function

Control Area: Commercial Advantages

Need for New Reliability Model

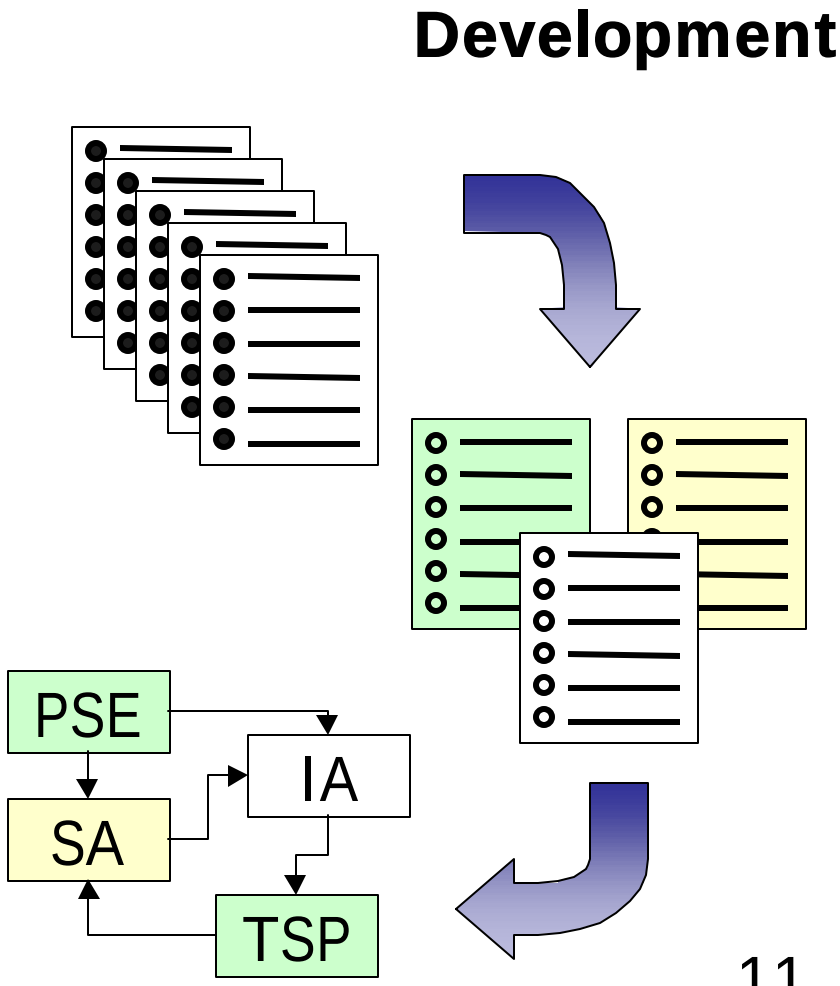
- “Unbundles” the Control Area’s functions
- Removes commercial advantage of performing the reliability functions
- Allows the marketplace the flexibility to develop portfolios of suppliers and customers
- Maintains transmission system reliability



The Reliability Model

The Reliability Model

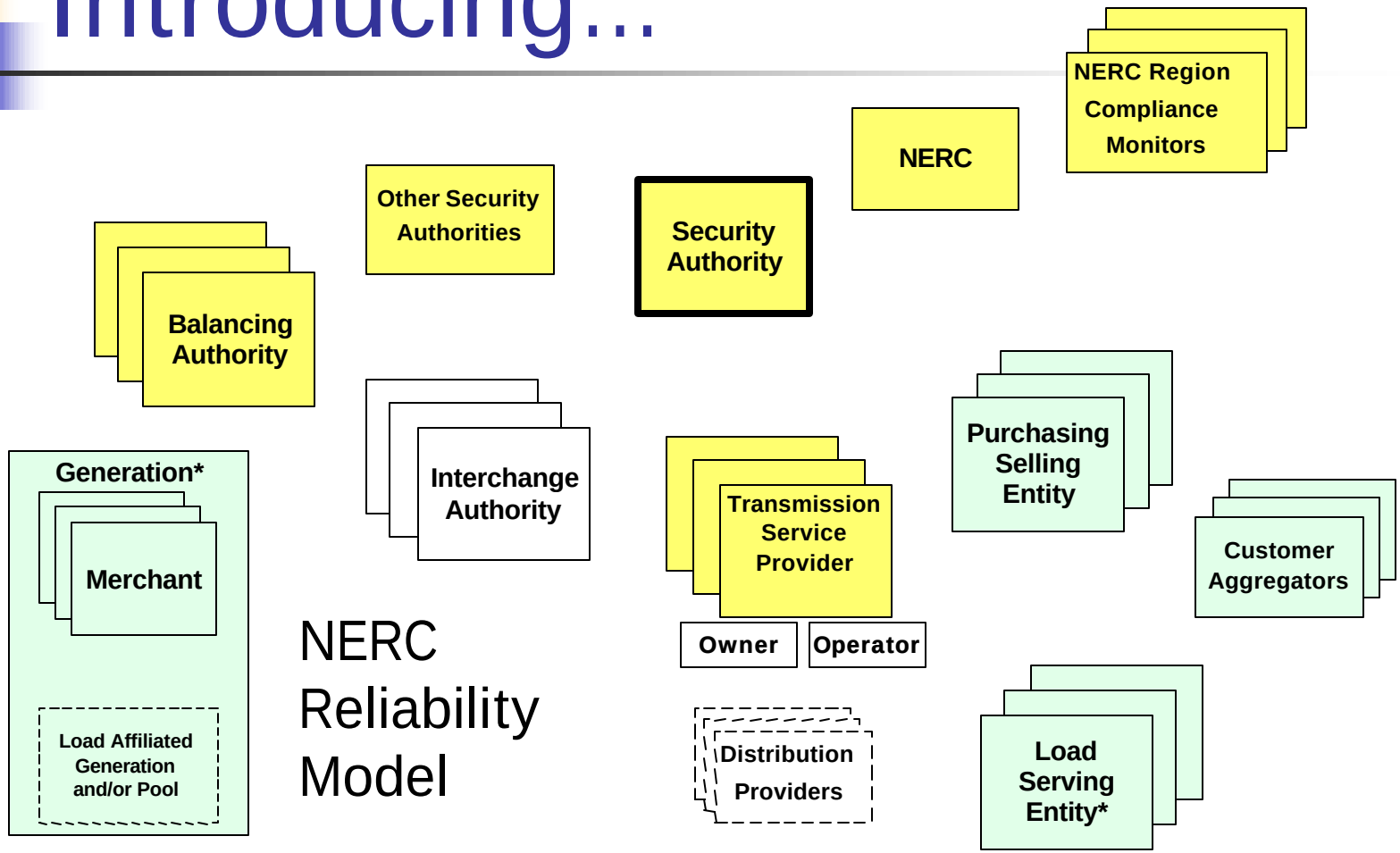
- **List** every operating function we could think of
- **Group** into Merchant and Reliability entities
- **Assign** to entities
  - Invent new entities as needed
  - Set up relationships



Definitions

- Merchant Function
  - “The generation, selling, reselling, or purchasing of electric energy, capacity, or resources-related services”
- Independent Function
  - “No corporate affiliation with the Merchant Function”

Introducing…



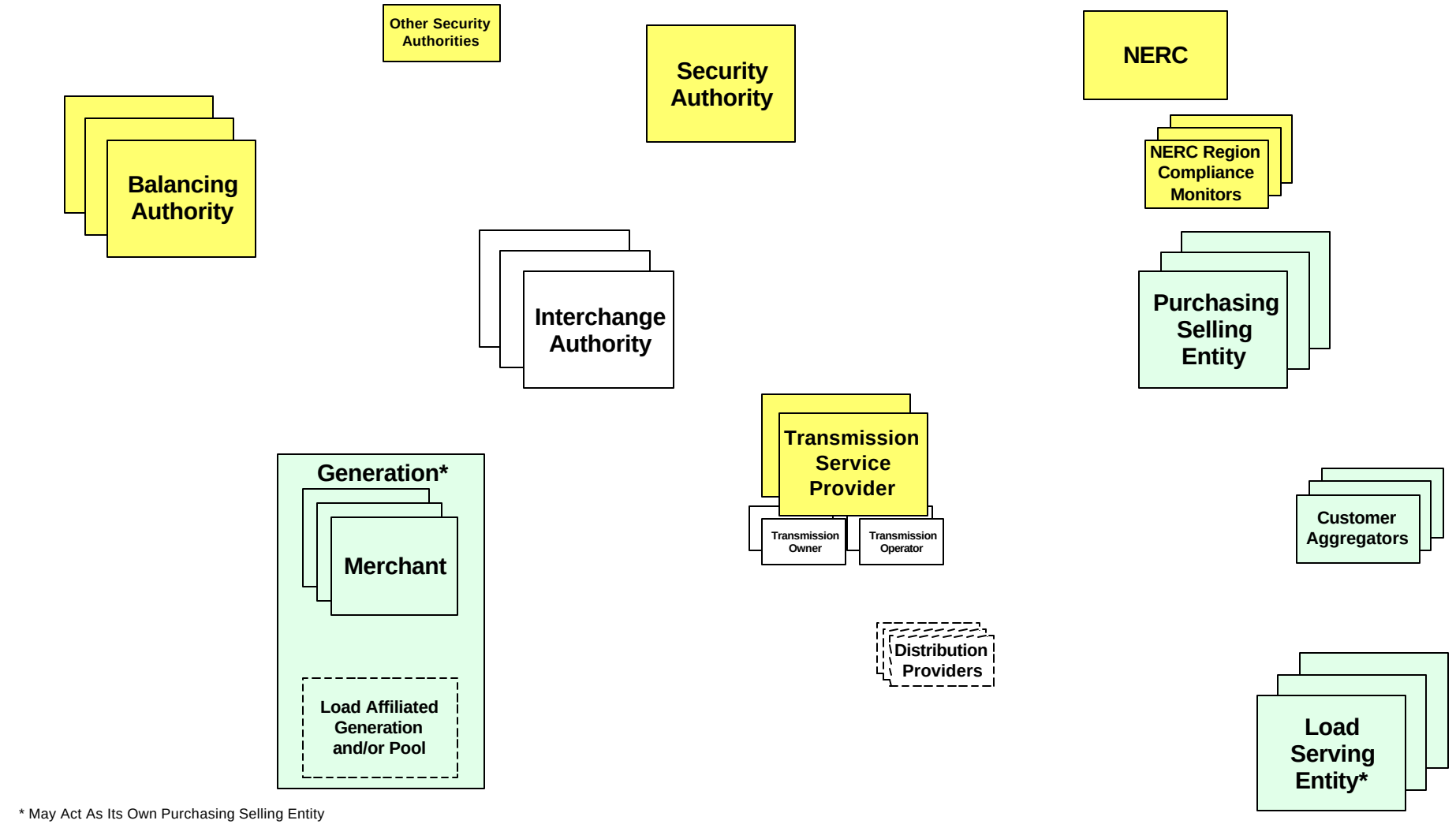
NERC Reliability Model

The Reliability Model

- Assigns reliability functions with market impacts to independent entities
- Assigns reliability functions to “root levels”
- “Blueprint” for unbundling the NERC Operating Policies
- Hands off to the OC for implementation

NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL

Reliability Model - Stakeholders View



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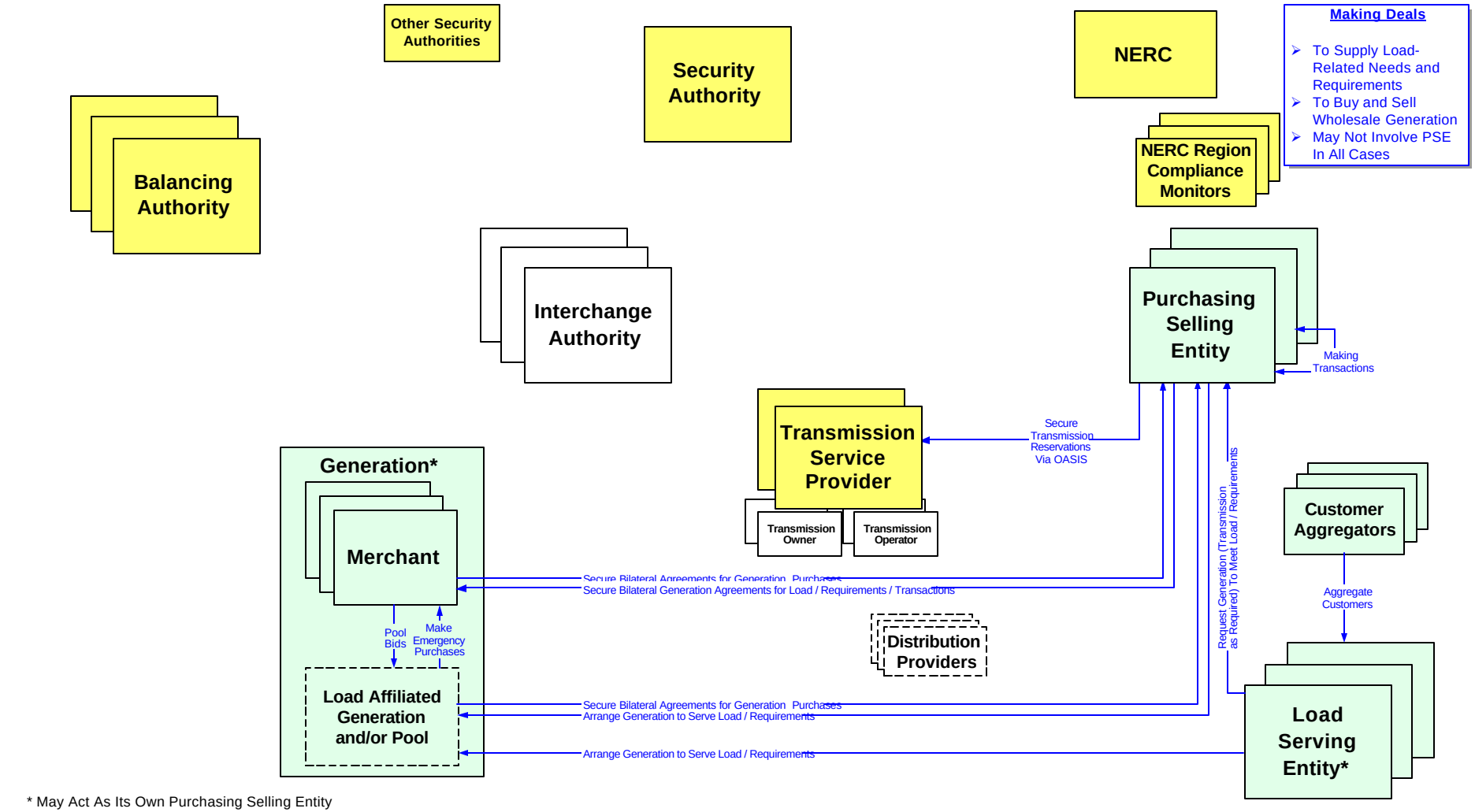
Reliability Model - Making Deals View



* May Act As Its Own Purchasing Selling Entity

Key: Making Deals | Transaction Approval & Plans Ahead of Time | Real Time | Reliability Policy Compliance | Merchant Function | Independent Function | Solid Line = Action | Dotted Line = Information

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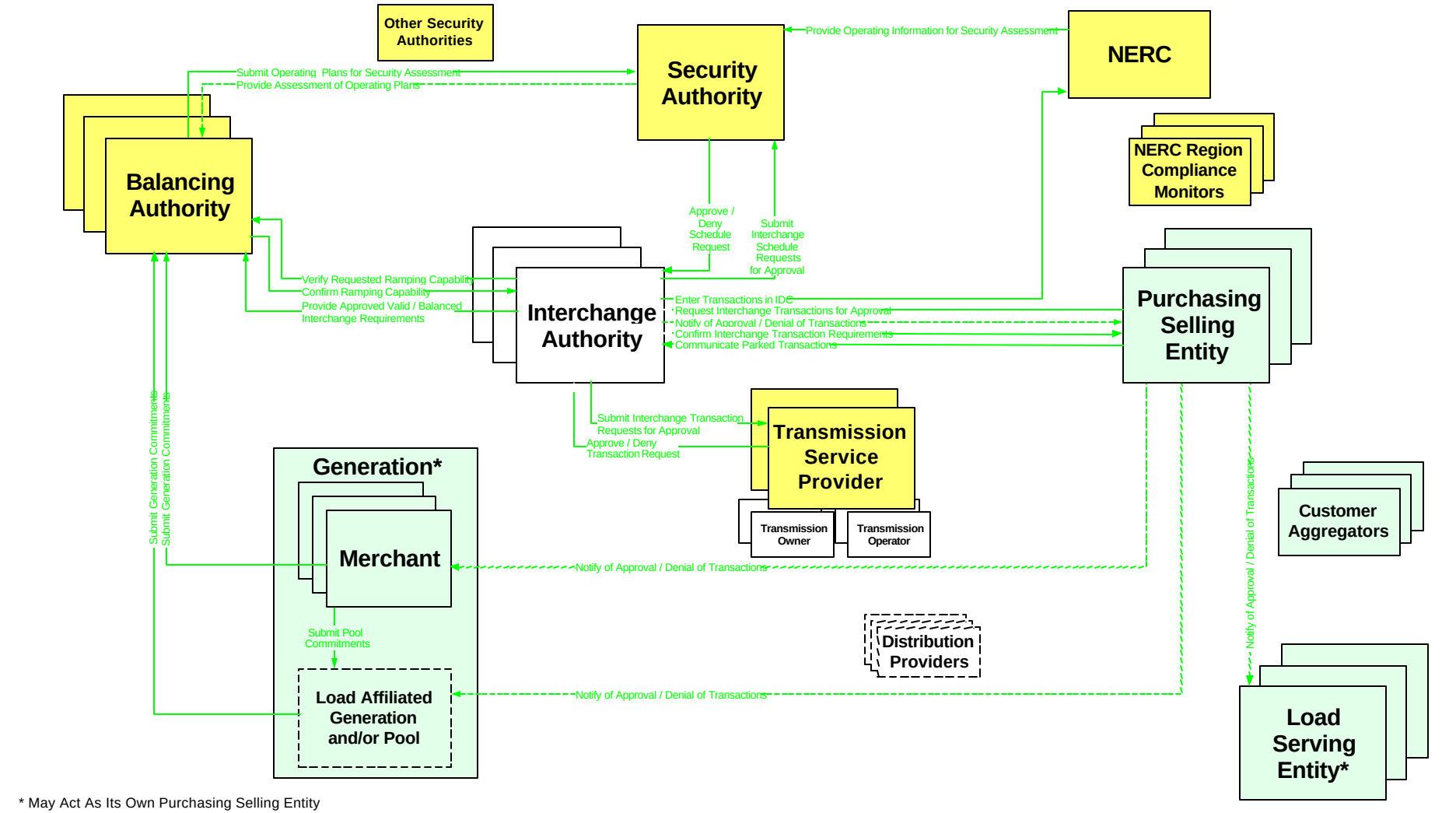
Reliability Model - Transaction Approval & Plans Ahead of Time



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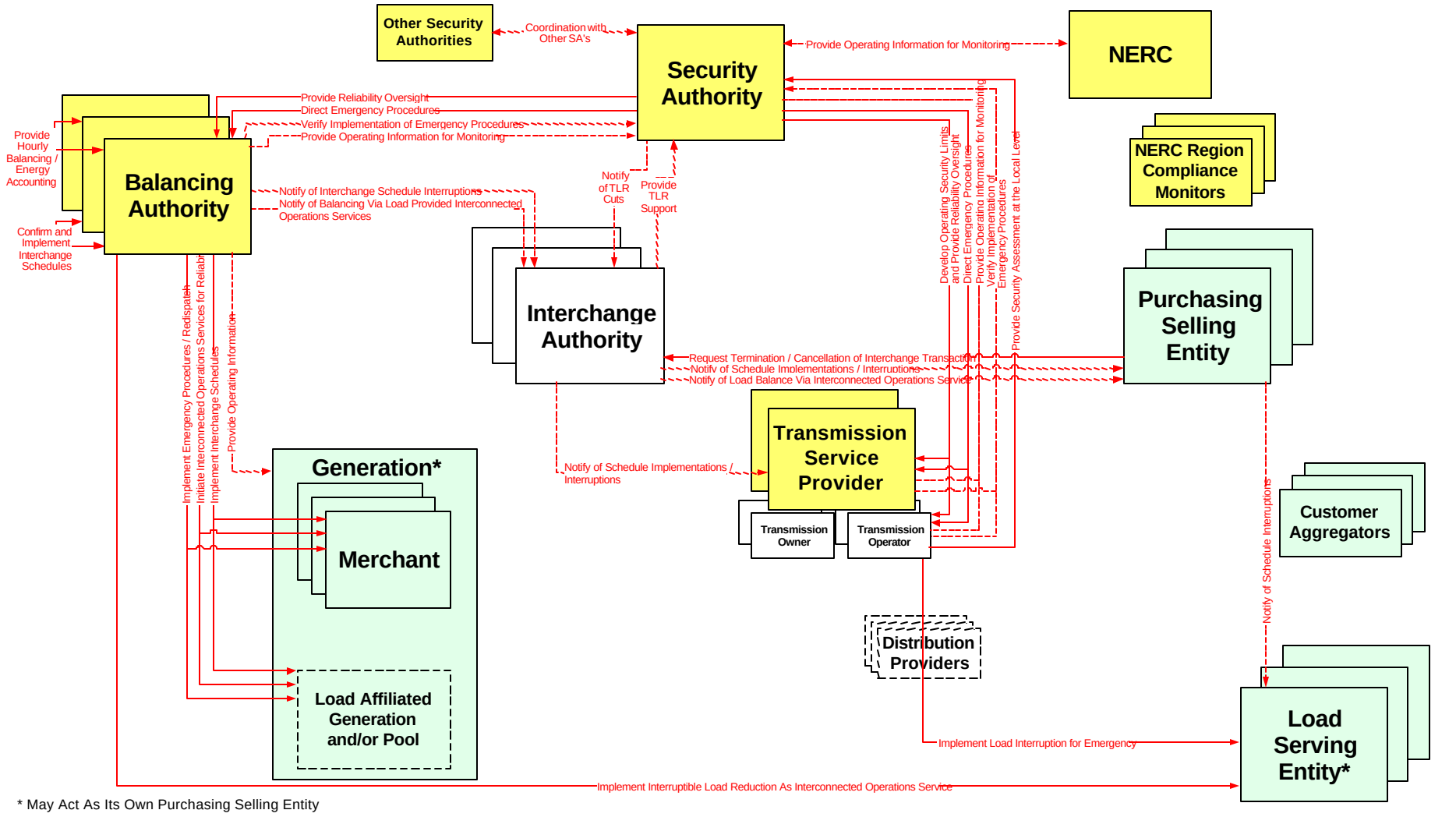
Reliability Model - Real Time View



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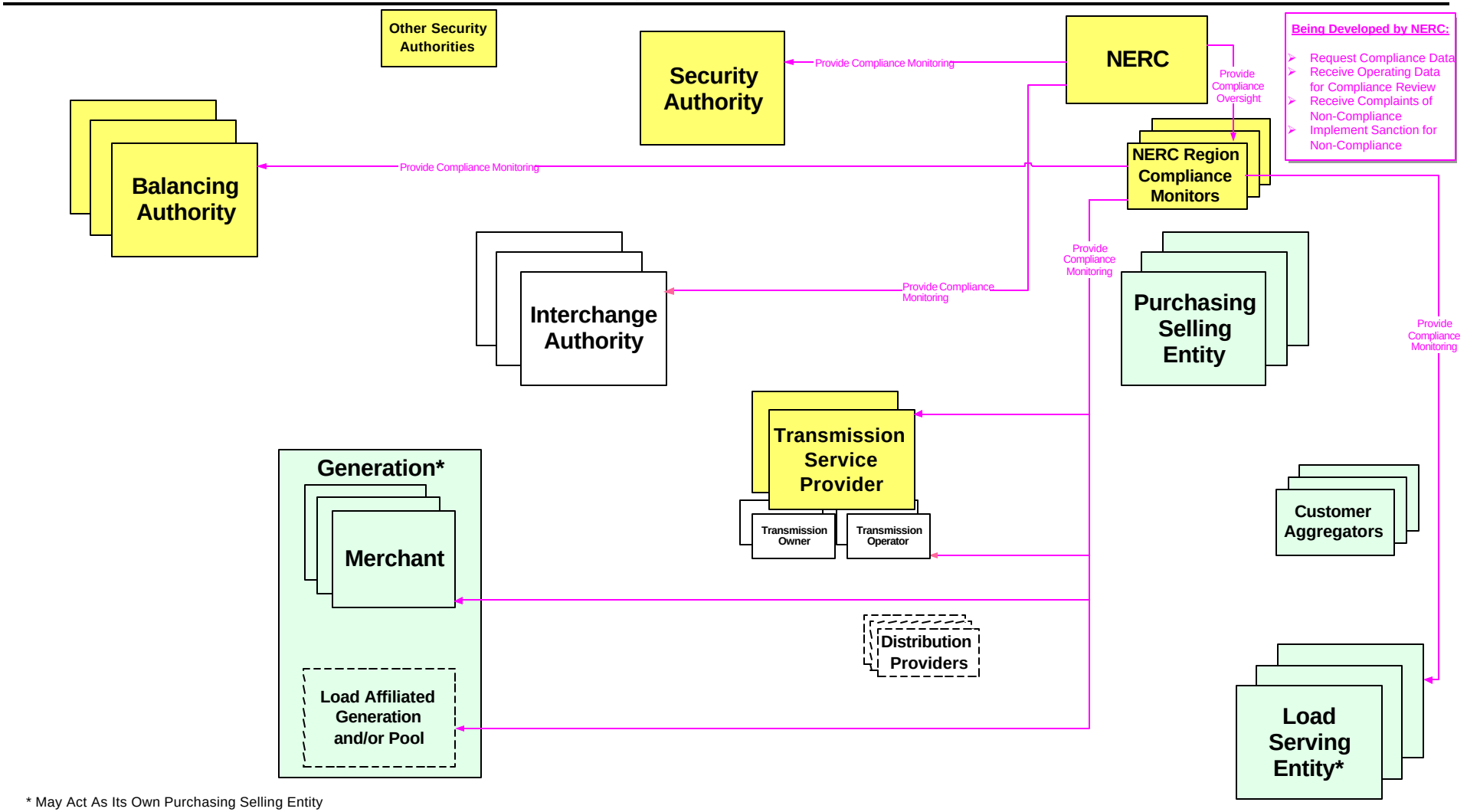
Reliability Model - Reliability Policy Compliance View



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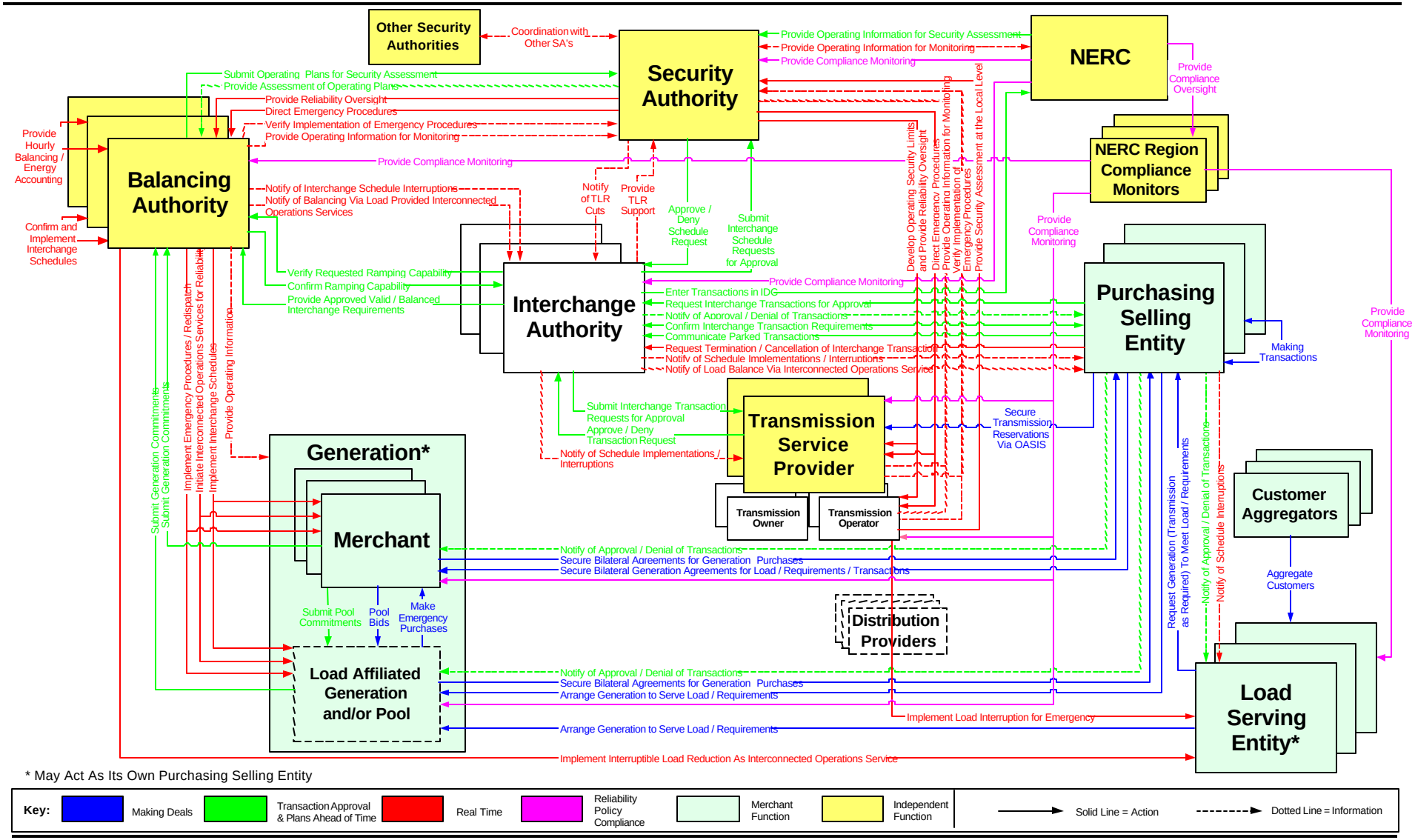
Reliability Model - Baseline View



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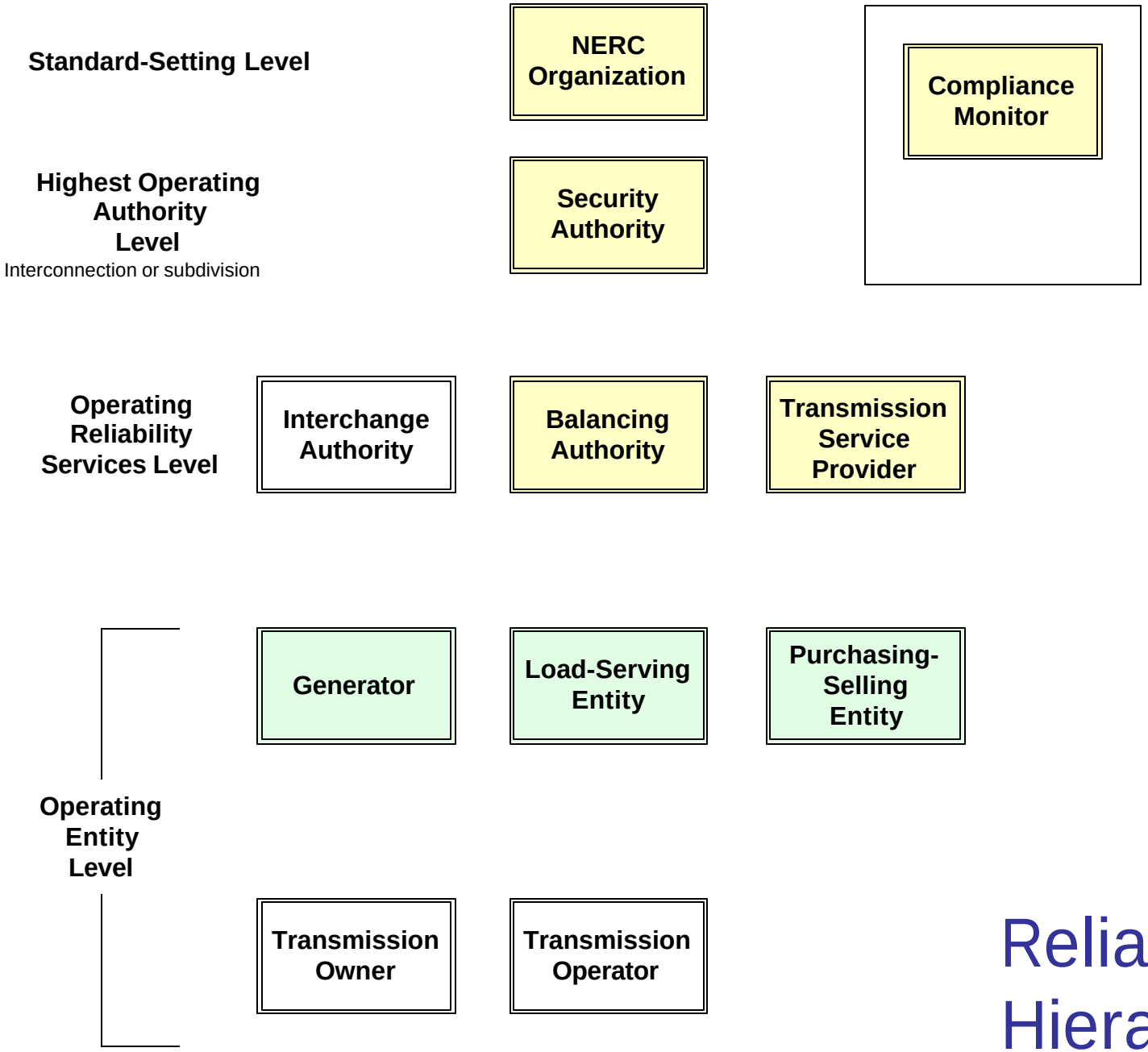
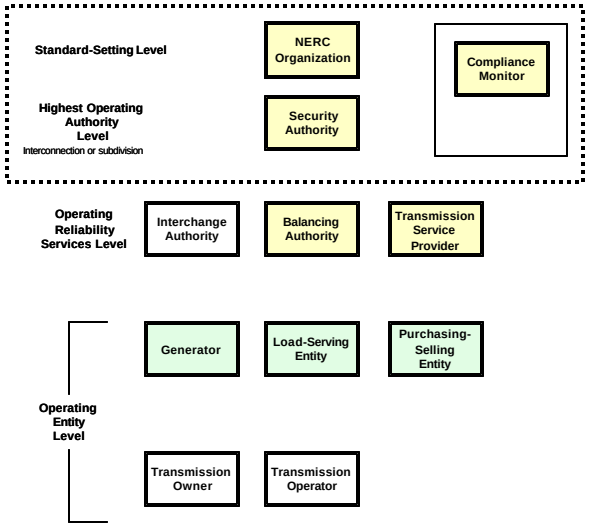
Reliability “Hierarchy”



Reliability Hierarchy

Reliability Hierarchy



Standard-Setting Level

NERC Organization

Develops Standards

Compliance Monitor

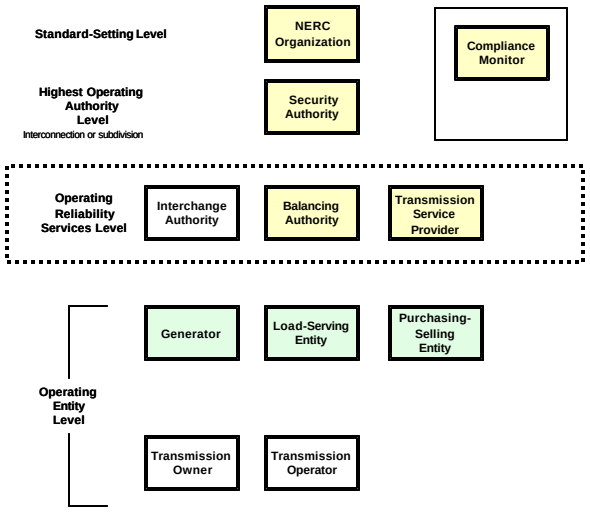
Reviews and ensures compliance with NERC Reliability Policies/ Standards, and administers sanctions/ penalties for non-compliance

Highest Operating Authority Level

Interconnection or subdivision

Security Authority

Ensures reliability of transmission system within its Security Area



Reliability Hierarchy

Operating Reliability Services Level

Interchange Authority

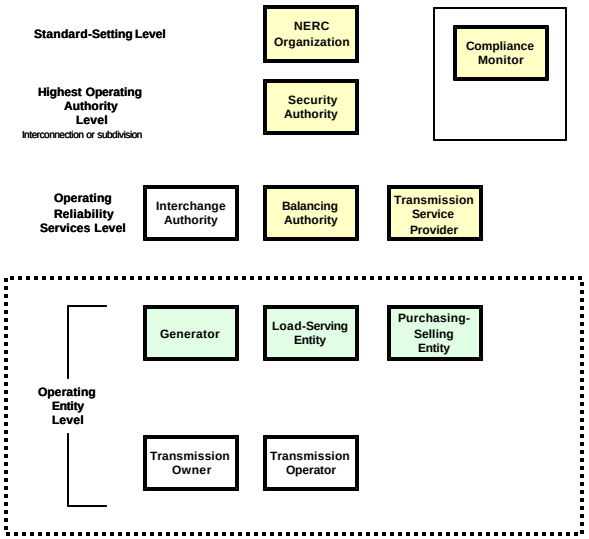
Provides approved, valid, and balanced Interchange Requirements.

Balancing Authority

- Integrates resource plans ahead of time
- Maintains load-generation balance and system frequency in real time

Transmission Service Provider

- Provides Transmission service
- Determines transmission adequacy
- Maintains local security



Reliability Hierarchy

Operating Entity Level

Generator

- Owns and operates generators
- Supplies energy
- Supplies IOServices

Load-Serving Entity

Secures energy and transmission to serve end-user

Purchasing-Selling Entity

Purchases or sells energy, capacity, and all necessary Interconnected Operations Services as required by the system

Transmission Owner

- Owns transmission

Transmission Operator

- Operates transmission

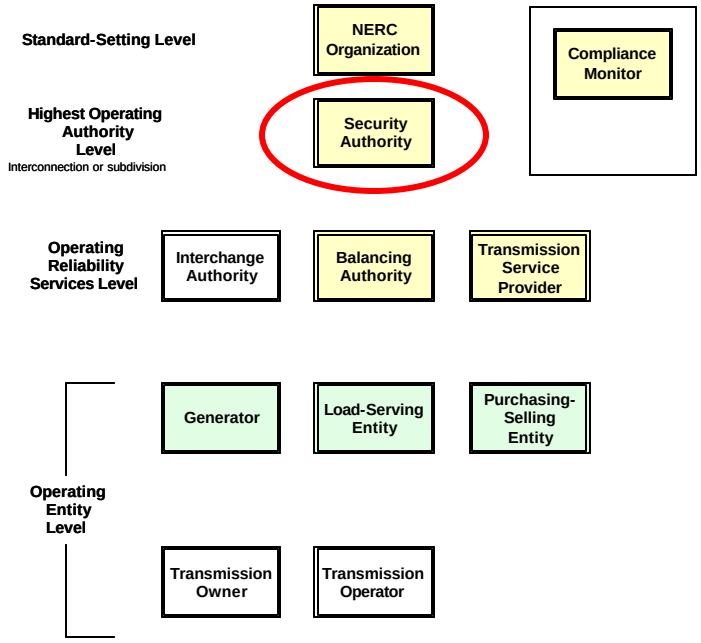
The Operating Reliability Services

- Security
- Balancing
- Interchange
- Transmission Service Provider

Definition

Security Authority

- Ensures reliability of transmission system within its Security Area



Criteria and Compliance

Security Authority

- NERC-certified
- Independent of Market Participants
- NERC-certified operators
- Code of Conduct
- NERC monitors for compliance

Responsibilities

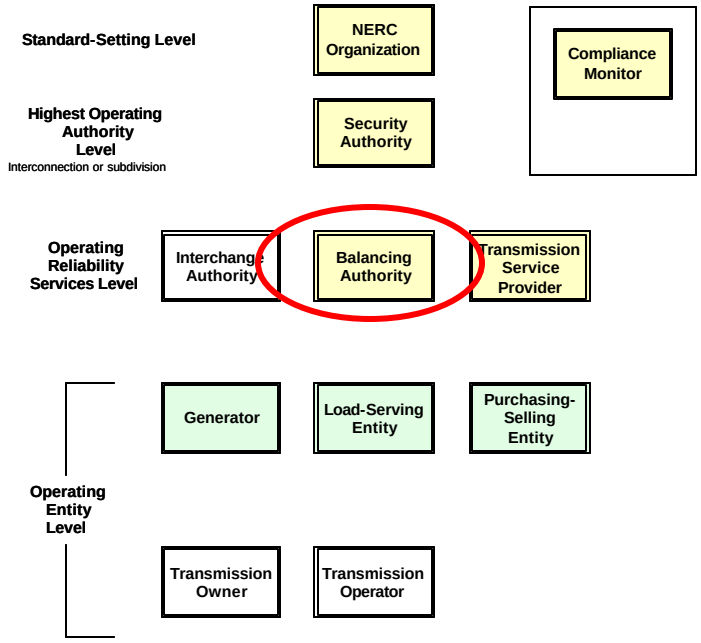
Security Authority

- Monitors G&T information
- Develops security limits
- Performs security analyses
- Determines Ancillary Service requirements
- Oversees G&T operations planning
- Coordinates actions with other SAs
- Mitigates security violations
- Coordinates restoration

Definition

Balancing Authority

- Integrates resource plans ahead of time and maintains load-gen balance and frequency in real time



Criteria and Compliance

Balancing Authority

- NERC-certified
- Independent of Market Participants(?)
- Must control:
  - Load and generation, or
  - Load and interchange, or
  - Generation and interchange, or
  - Generation, load, and interchange
- NERC-certified operators
- Code of Conduct
- NERC/Region monitors for compliance

Responsibilities

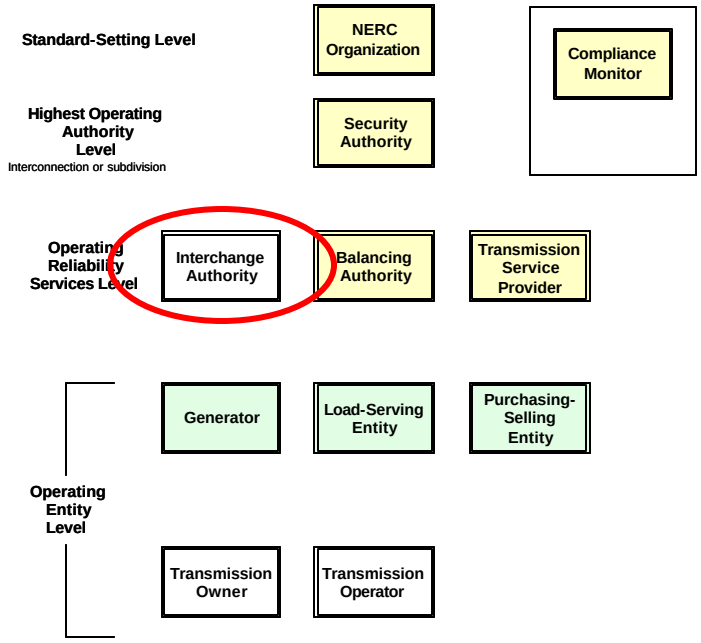
Balancing Authority

- Verifies generation/load requirements
- Formulates operation plans for security assessment
- Confirms and implements interchange schedules
- Ensures gen/interchange/load balance in real time
- Determines requirements and arranges for Ancillary Services
- Provides frequency control

Definition

Interchange Authority

- Provides approved, valid, and balanced Interchange requirements



Criteria and Compliance

Interchange Authority

- NERC-certified
- May or may not be independent of Market Participants
- NERC-certified operators
- Code of conduct
- NERC monitors for compliance

Responsibilities

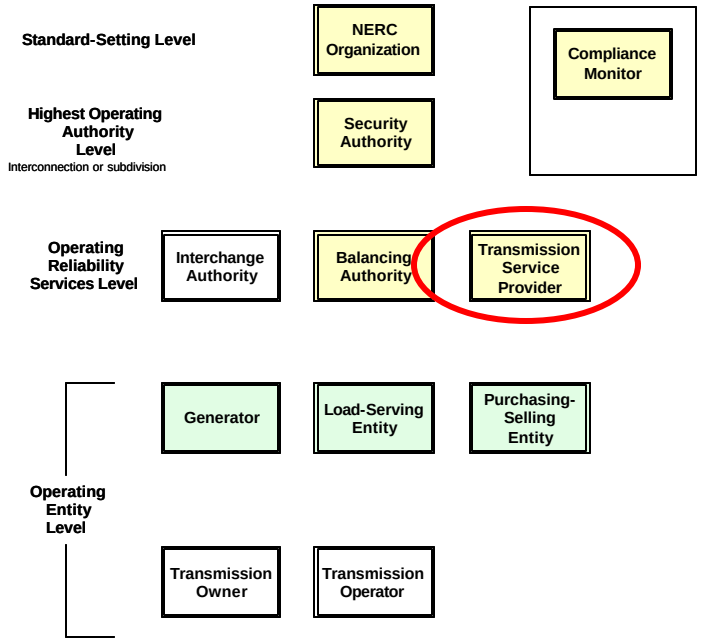
Interchange Authority

- Determines balanced Interchange Schedules from tags
  - Validates sources and sinks
  - IOServices
- Collects Transaction approvals/denials
- Enters Transactions into IDC (or equivalent)

Definition

Transmission Service Provider

- Manages transmission system and provides Transmission Services to market participants under applicable agreements, and
- Determines transmission adequacy



Criteria and Compliance

Transmission Service Provider

- NERC-certified
- Must provide access in accordance with applicable transmission service agreements
- Independent of Market Participants
- Code of conduct
- NERC Region monitors for compliance

Responsibilities

Transmission Service Provider

- Maintains OASIS
- Accepts reservations via OASIS
- Approves/denies transmission service requests
- Approves/denies Interchange Transactions
- Calculates ATC

Transmission Owner and Operator

Transmission Service Provider

Transmission Owner

- Establishes facility ratings
- Establishes revenue req’ts

Transmission Operator

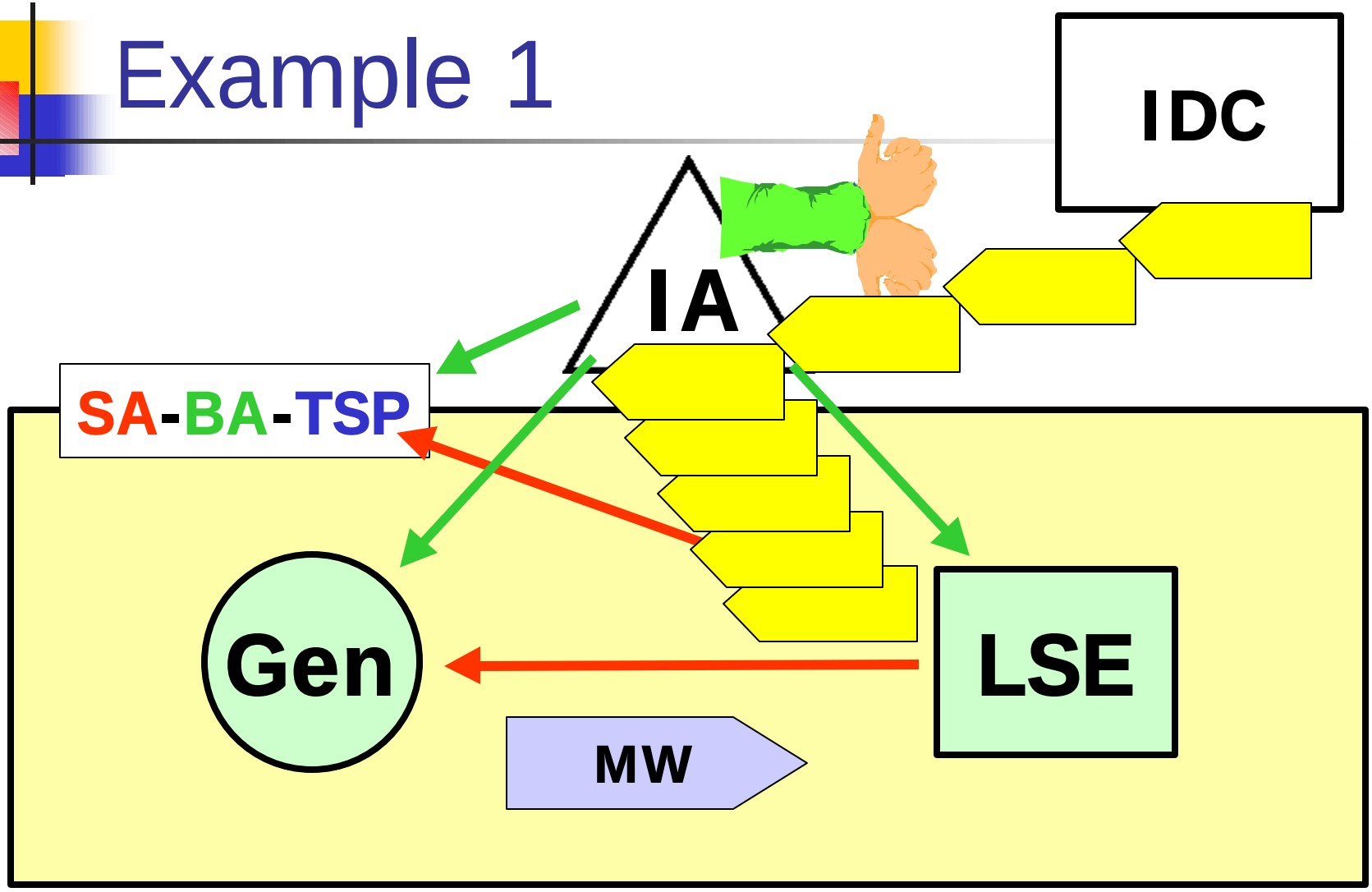
- Operates facilities

Remaining Entities and Authorities

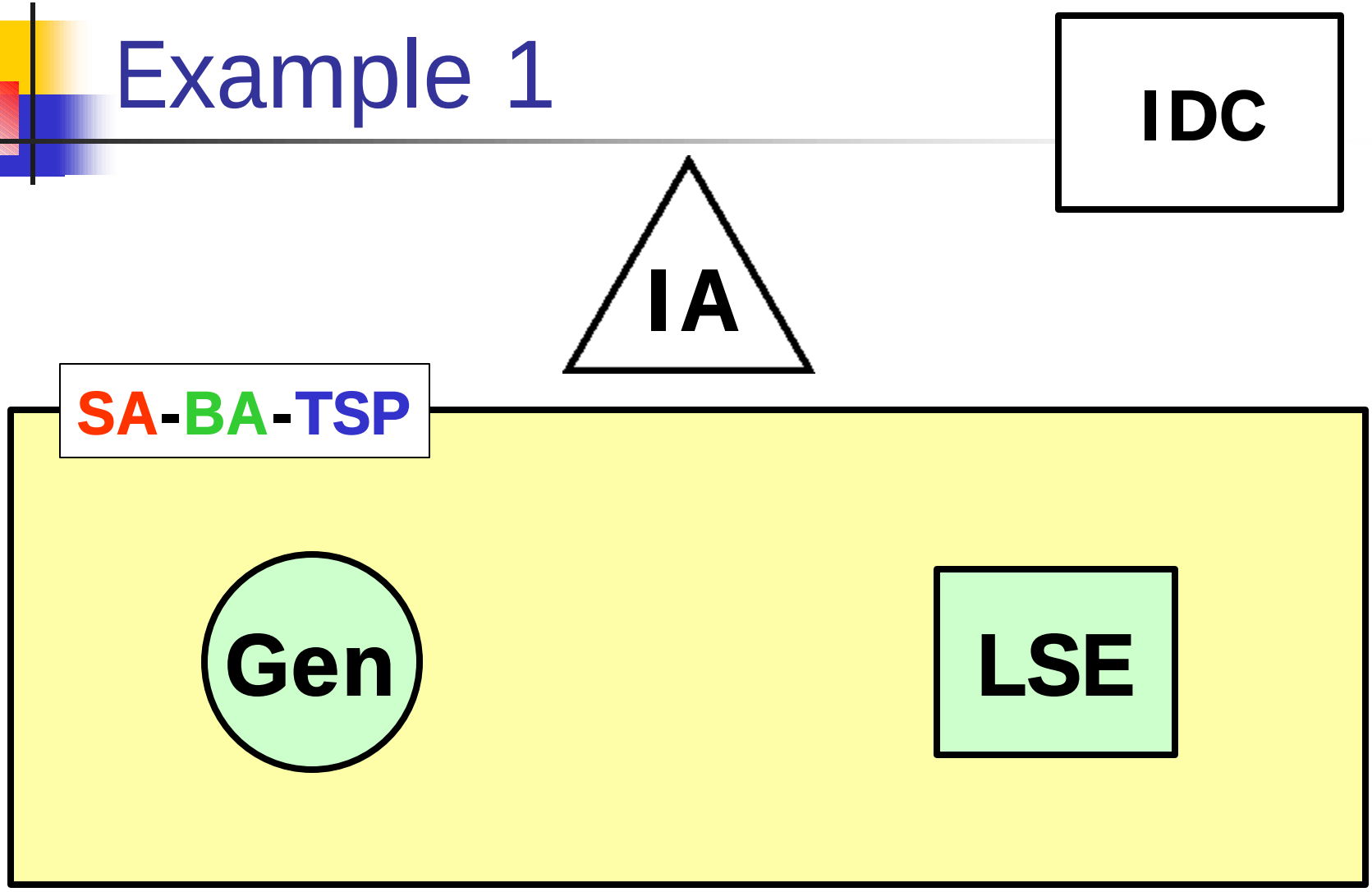
- Generators
- Load-Serving Entities
  - Load aggregators
- Purchasing-Selling Entities
- Distribution Providers
- NERC Region Compliance Monitor
- NERC Organization

Examples

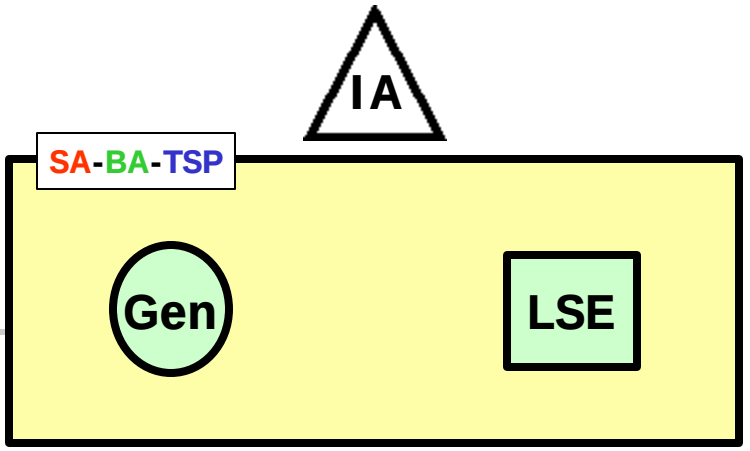
Example 1



Example 1

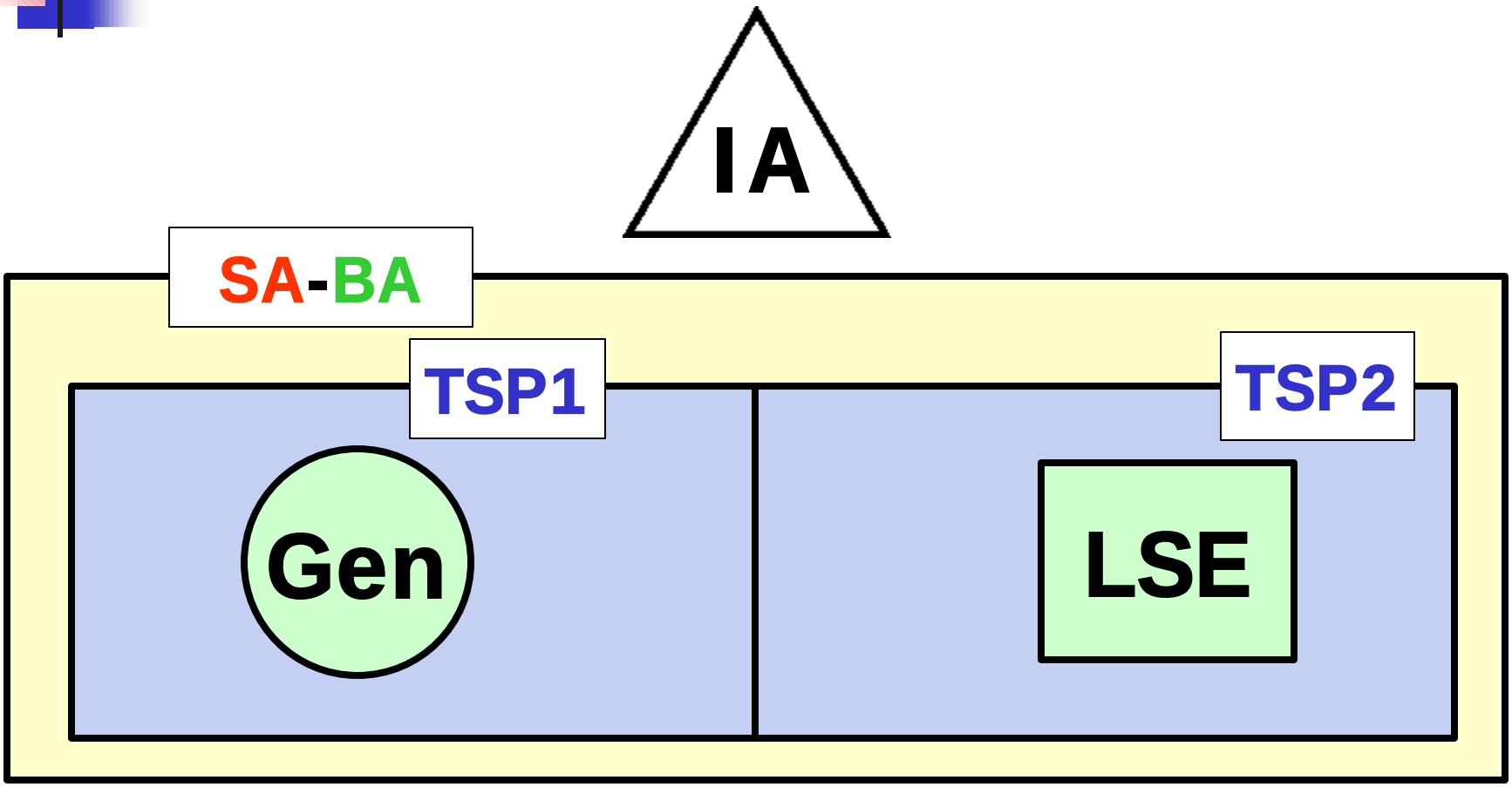


Example 1

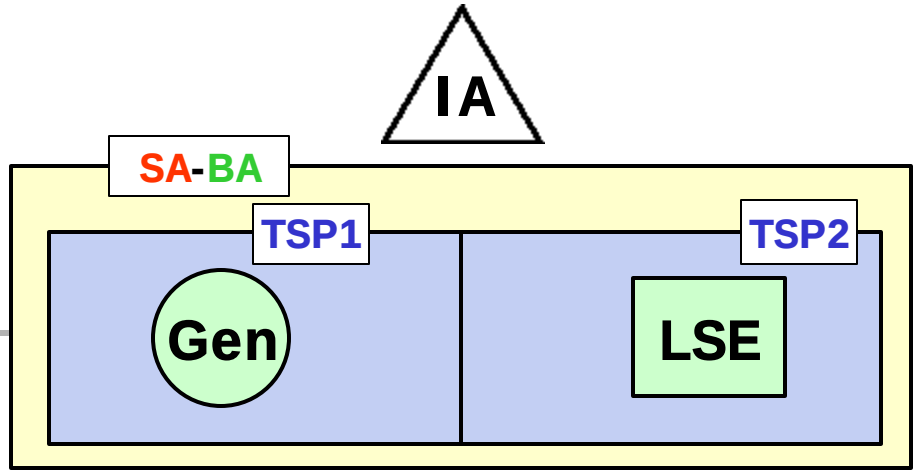


- LSE Contacts Gen
- LSE reserves transmission from TSP
- LSE submits tag to IA
- IA verifies with SA, BA, and TSP
  - BA must approve transaction for ramping capability
  - SA must approve transaction for security
  - TSP must confirm reservation and approve use of the transmission system
- IA Confirms or Denies and notifies all parties
- IA enters Transaction into IDC
- BA enters Schedule into EMS

Example 2

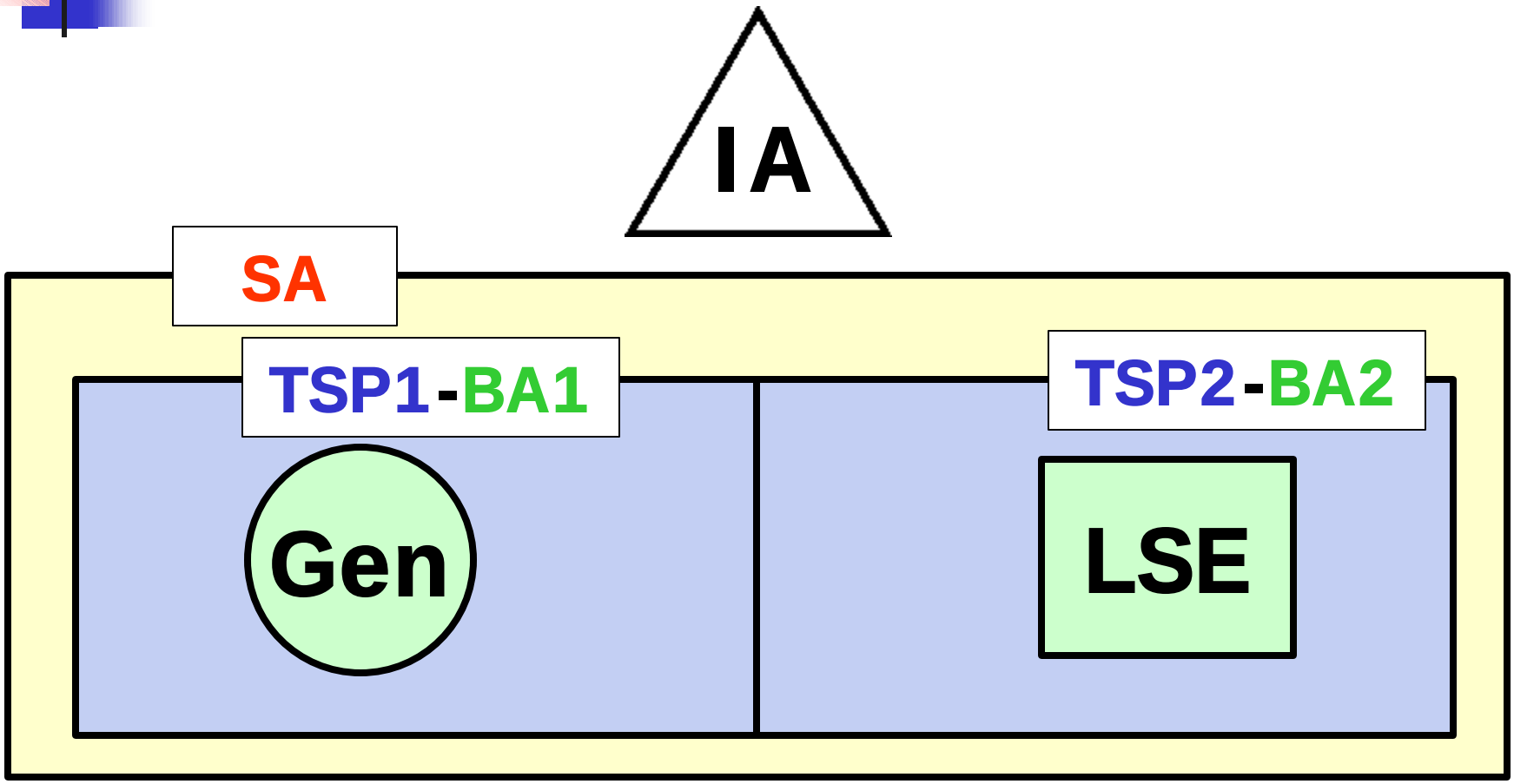


Example 2

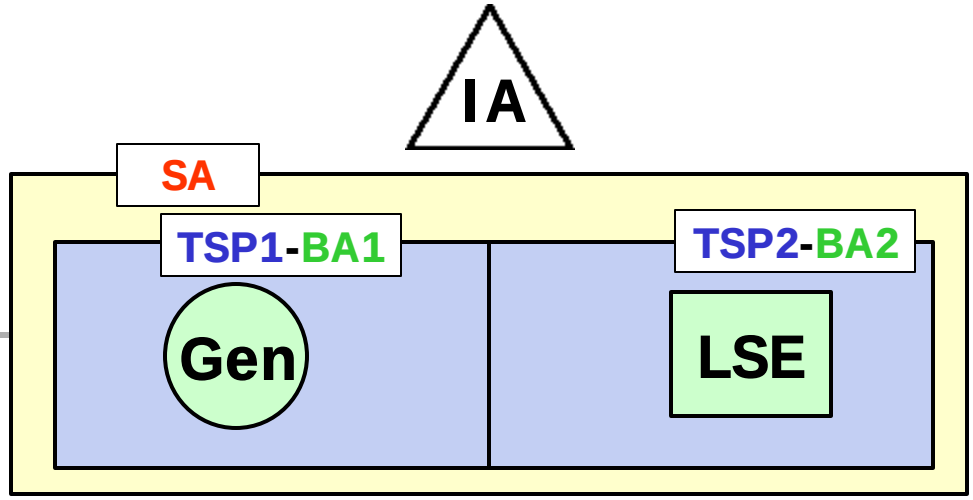


- LSE Contacts Gen
- LSE reserves transmission from TSP1 and TSP2
- LSE submits tag to IA
- IA verifies with SA, BA, and TSP1 and TSP2
  - BA must approve transaction
  - SA must approve transaction
  - TSP1 and TSP2 must confirm reservation and approve use of the transmission system
- IA Confirms or Denies and notifies all parties
- IA enters Transaction into IDC
- BA enters Schedule into EMS

Example 3

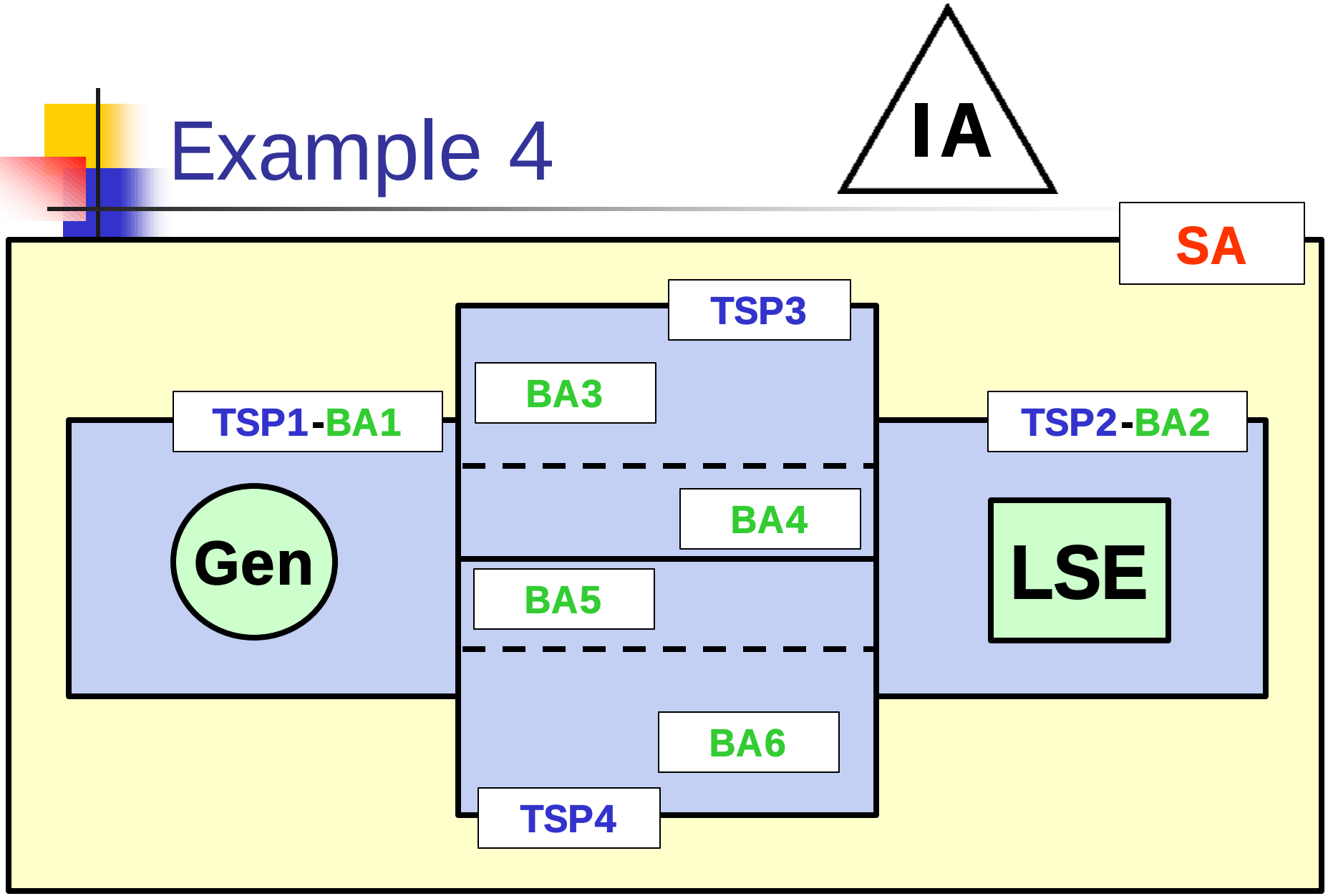


Example 3

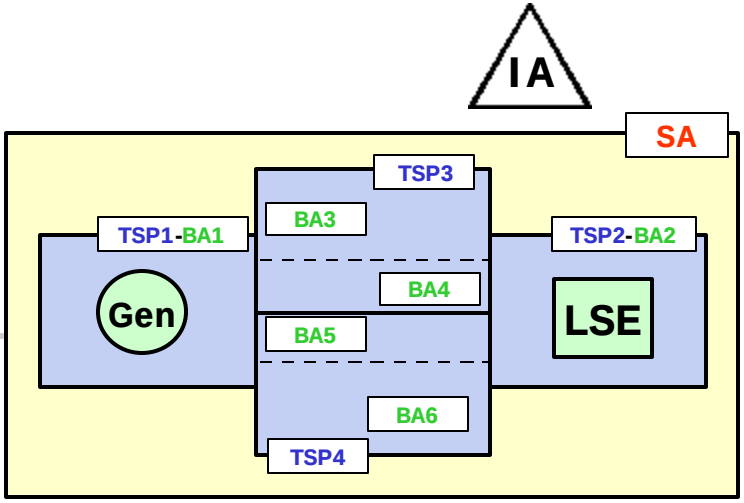


- LSE Contacts Gen
- LSE reserves transmission from TSP1 and TSP2
- LSE submits tag to IA
- IA verifies with SA, BA1, BA2, TSP1 and TSP2
  - BA1 and BA2 must approve transaction
  - SA must approve transaction
  - TSP1 and TSP2 must confirm reservation and approve use of the transmission system
- IA Confirms or Denies and notifies all parties
- IA enters Transaction into IDC
- BA1 and BA2 enter Schedule into EMS

Example 4



Example 4

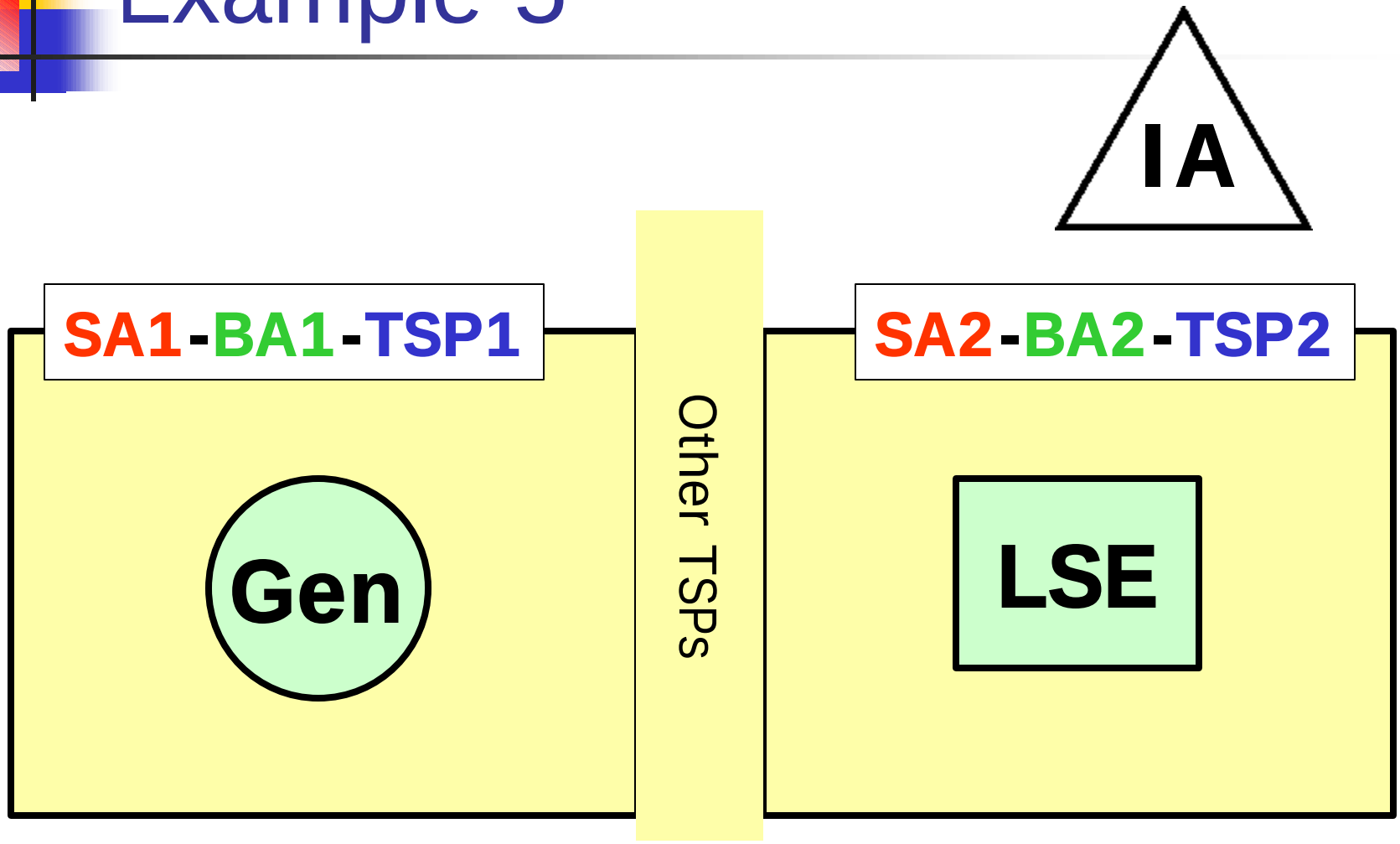


- LSE Contacts Gen
- LSE reserves transmission from TSP1-TSPx-TSP2
- LSE submits tag to IA
- IA verifies with SA, BA1, BA2, TSP1-TSPx-TSP2
  - BA1 and BA2 must approve transaction
  - SA must approve transaction
  - TSP1-TSPx-TSP2 must confirm reservation and approve use of the transmission system
- IA Confirms or Denies and notifies all parties
- IA enters Transaction into IDC
- BA1 and BA2 enter Schedule into EMS

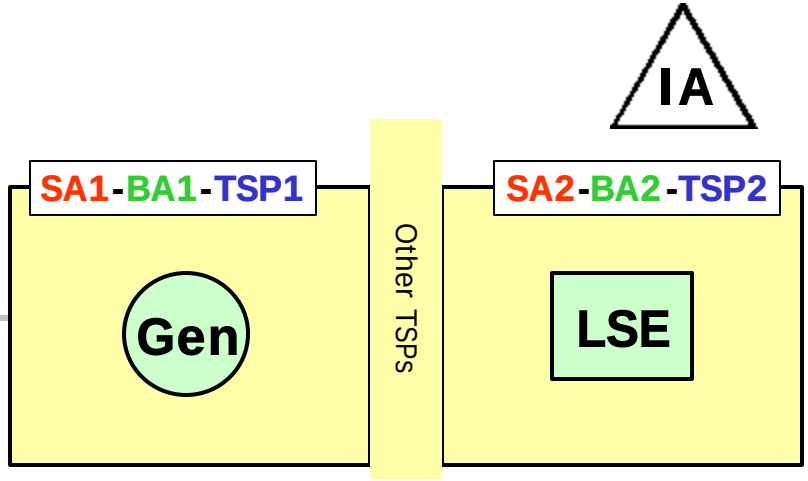
No, It's NOT "Skip Scheduling"

- Skip scheduling refers to scheduling between non-adjacent Control Areas
- New model requires a contiguous transmission path, but
- The "intermediary" Balancing Authorities have no role in the transaction
- Losses are paid in $$, not MW

Example 5



Example 5



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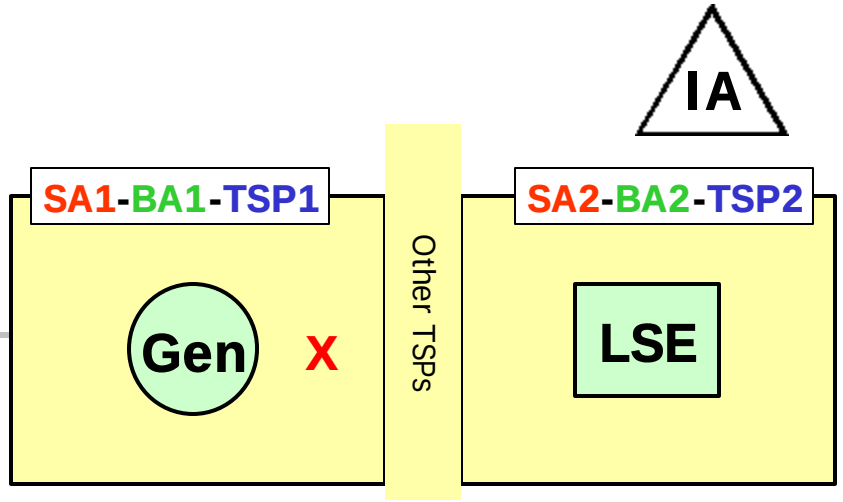
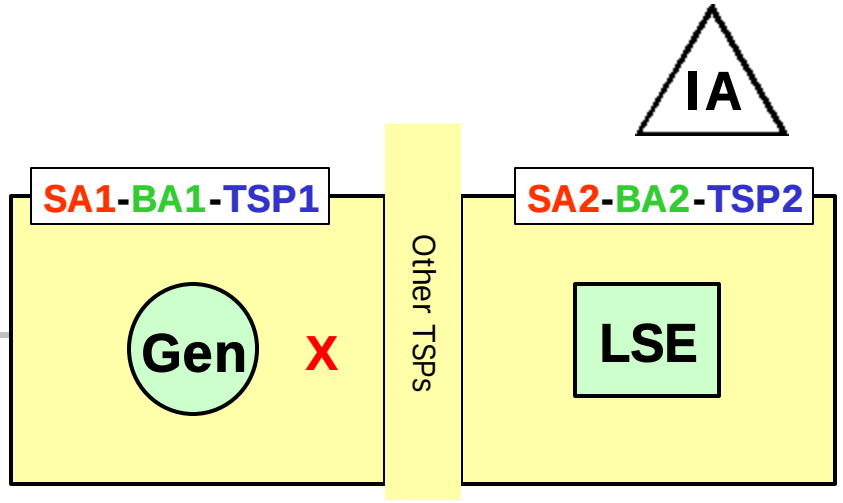
- LSE reserves transmission from TSP1-TSPx-TSP2
- LSE submits tag to IA
- IA verifies with SA1, SA2, BA1, BA2, TSP1-TSPx-TSP2
  - BA1 and BA2 must approve transaction
  - SA1 and SA2 must approve transaction
  - TSP1-TSPx-TSP2 must confirm reservation and approve use of the transmission system
- IA Confirms or Denies and notifies all parties
- IA enters Transaction into IDC
- BA1 and BA2 enter Schedule into EMS

Curtailment



- Tx Operator requests relief from SA1
- SA1 obtains curtailment list
- SA1 notifies SA2 (SA of the Sink BA)
  - Alerts IA of pending curtailment
- SA2 notifies BA2

Curtailment



- BA2 confirms curtailment with BA1 (ramping)
- BA1 directs Gen to adjust output
- BA2 contacts IA to adjust schedule
- BA1 and BA2 confirm curtailment with SA1 and SA2
- IA notifies PSEs of curtailment

Relationships

Stakeholder Table

Stakeholders	Reliability Function	Merchant Function	Independent Function
Security Authority	✔		✔
Balancing Authority	✔	May Purchase Ancillary Svc.	?
Interchange Authority	✔		
Transmission Service Provider	✔	May Purchase Ancillary Svc.	✔
Transmission Owner	✔		
Transmission Operator	✔		
Generator	✔	✔	
Load Serving Entity	✔	✔	
Purchasing Selling Entity		✔	
Customer Aggregator		✔	
Compliance Monitor	✔		✔
NERC Organization	✔		✔

Reliability Model Functional Check

		Entity							
		BA	TSP	SA	IA	GEN	PSE	LSE	COMP
Function	BA					X	X	X	
	TSP					X	X	X	
	SA					X	X	X	
	IA								
	GEN	X	X	X					X
	PSE	X	X	X					X
	LSE	X	X	X					X
	COMP					X	X	X	

Rollup Table

Examples of Organizations Compatible with Reliability Model								
Independent Organizations	**BA**	**TSP**	**SA**	**IA**	**GEN**	**PSE**	**LSE**	**COMP**
PJM	✓	✓	✓	✓				
IMO	✓	✓	✓	✓				
CISO	✓	✓	✓	✓				
ERCOT (ISO)		✓	✓	✓				✓
MISO (RTO)		✓	✓	✓				
Examples of Organizations Not Compatible with Reliability Model								
Organizations*	**BA**	**TSP**	**SA**	**IA**	**GEN**	**PSE**	**LSE**	**COMP**
1. Traditional Utility	✓	✓	✓	✓	✓	✓	✓	
2. Utility without transmission	✓			✓	✓	✓	✓	
3. Utility without generation	✓	✓	✓	✓		✓	✓	
4. Non-Traditional Utility	✓	✓		✓	✓	✓	✓	